# MECHELECIV

THE STUDENTS MAGAZINE • VOL. 28 • APRIL 1970 • NO. 5
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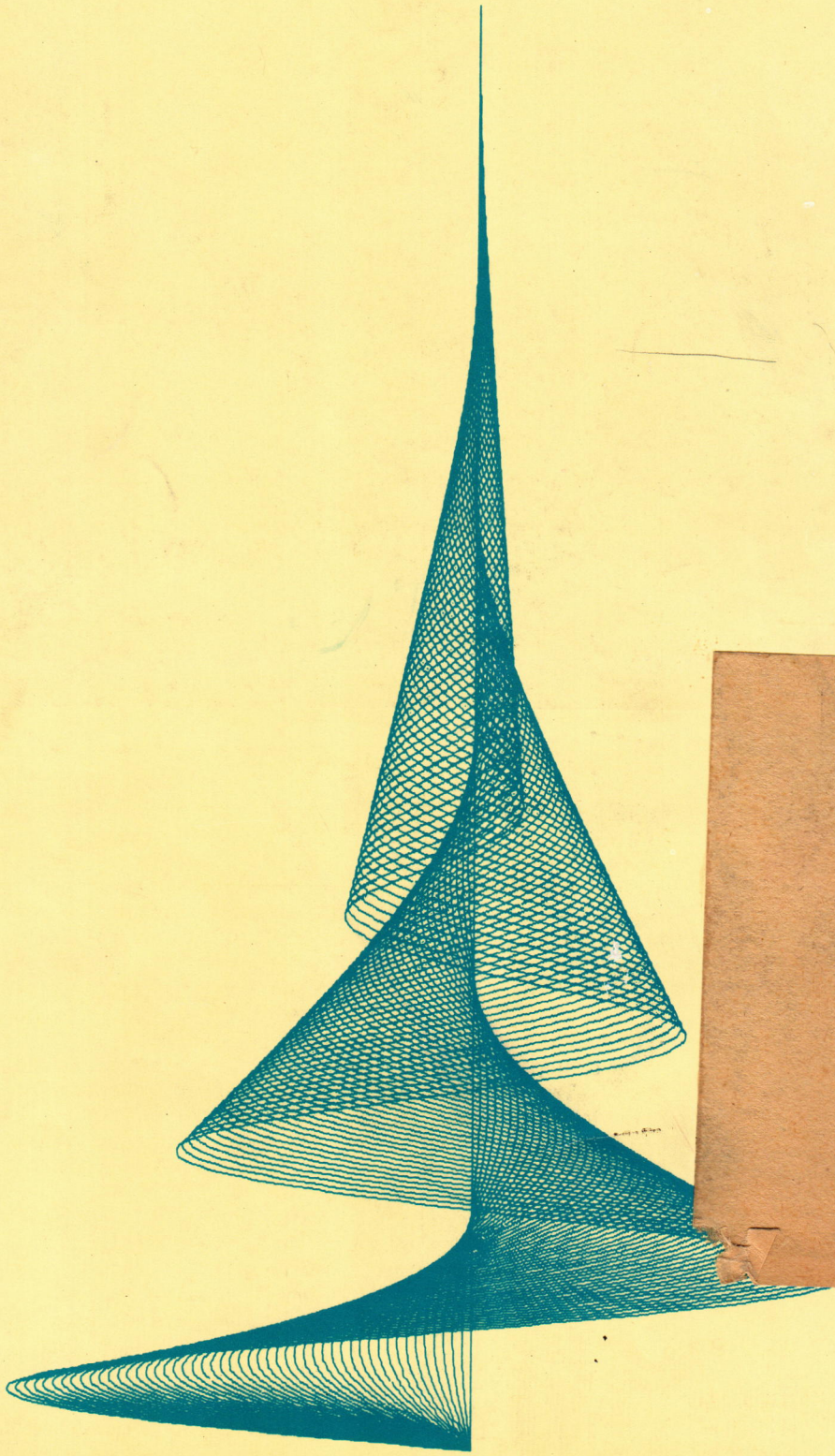

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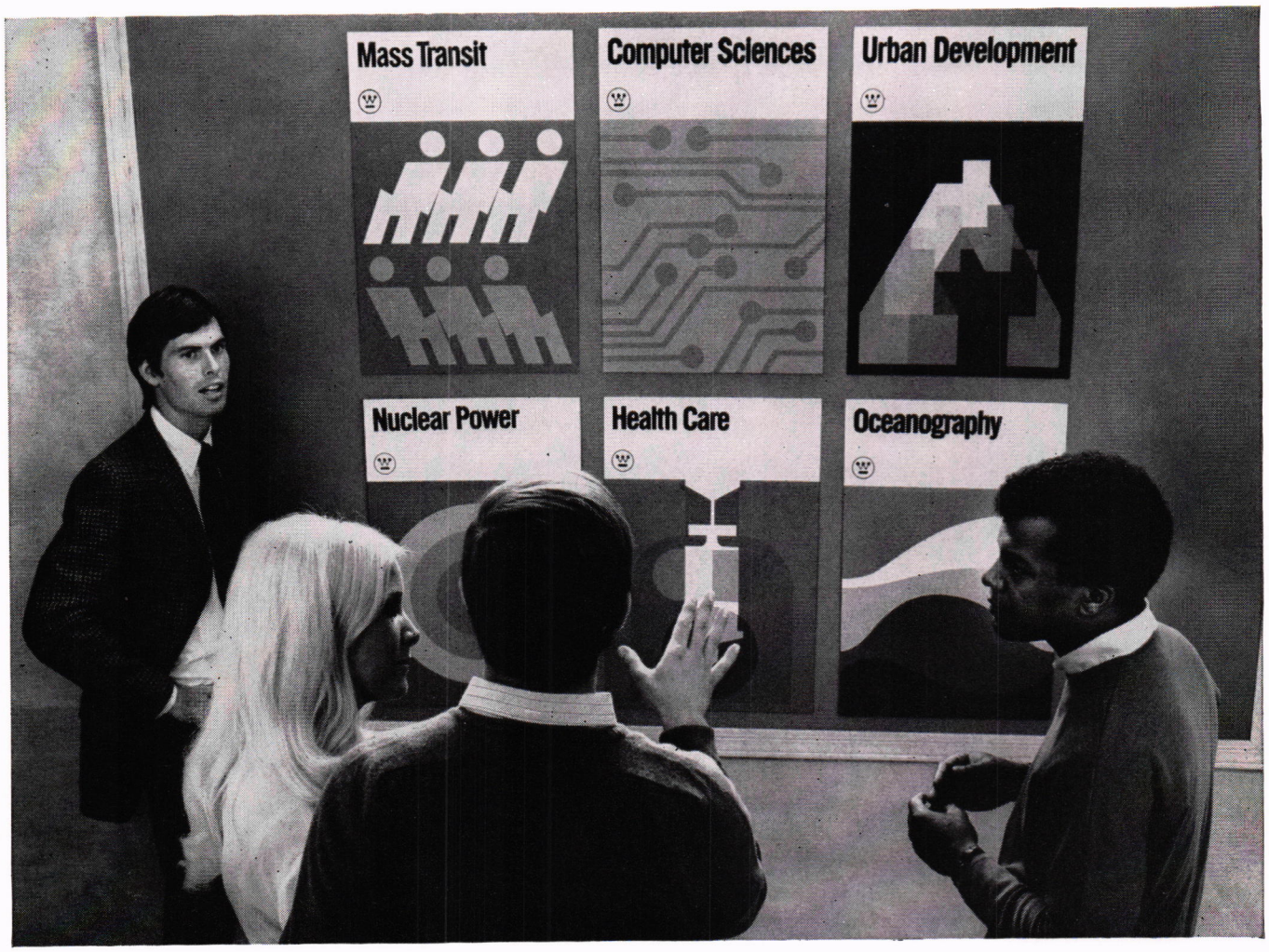


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THE STUDENTS MAGAZINE • VOL. 28 • APRIL 1970 • No. 5



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# EDITORIAL

During the last Engineers' Council meeting of the 1969-70 academic year, held in the middle of May, the usual rambling orations, quarrelsome cross-talk, and tedious repetition of oft-heard apparently insoluble crises was kept to a pleasing minimum by the new administration, principally by new Council president, Don Wallroth. Perhaps the presence of Dean Harold Liebowitz, the two new graduate representatives to the Council, and Dr. Barry Hyman helped to temper the usually random course of previous meetings.

At any rate, a sense of seldom felt unity pervaded the Council proceedings when it became apparent why Dr. Hyman was in attendance.

About half way through the meeting, Dr. Hyman proposed that the Engineers' Council as the representative body of the School of Engineering and Applied Science take and make known some formal position about "what has been going on recently". More than likely, after this statement, each Council Member had a different idea of why Dr. Hyman wanted us to stick out our necks. Further clarification by Dr. Hyman made it clear that it was really not so much which issue we chose as long as we took a stand.

It is generally known that Dr. Hyman could validly be classified as a sometime activist. From where this editor sits, he is pro student movement and very anti Vietnam and Cambodia, particularly when Mr. Nixon has anything to do with it. Dr. Hyman, however, should be admired for his tactful manner of presenting his desires to the Council.

I doubt that anyone would have any difficulty in guessing the Council's action concerning Dr. Hyman's proposal. You guessed it, fans: we took a vote and decided not to consider considering to take a stand on anything "that had been happening recently"!

Admittedly, the Council can not presume to represent the political voice of S.E.A.S., but can we not at least, as your representatives, consider making a statement pertaining to something other than who's going to pick up the tab for that luncheon last month without a vote-down and cessation of discussion.

The major gist of what little conversation ensued following Dr. Hyman's "no-no" related to the possible consequences emanating from you, the represented body, to us, your duly elected representatives, if we were to agree or disagree with Mr. Nixon's Cambodia, with the National Guard at Kent State, or with faculty & administration action pertaining to final exams.

I can see some merit in the argument advanced that we were not elected to pass off our opinions as your own unless they dealt with such timely issues as "more scotch or more gin at the Engineer's Ball". However, these last few months have been a strain on all student governing bodies all over the country.

I, for one, don't feel proud of the way our Engineers' Council handled what little opportunity came its way to utter its seldom heard voice on something other than the price of hot dogs for a luncheon.

# REHABILITAT

# R

B

JAMES B

The dictionary defines rehabilitation as "restoration to a condition of health or useful and constructive activity." When a person is severely disabled by accident or disease, it is the job of a medical team to repair the human resources that have been damaged. When the human machine is permanently damaged, a rehabilitation team must then take over and return the person to a productive life. The engineer is an important member of this team, since he must devise methods of substitution and assistance for the lost or injured organs and appendages.

These means of restoring the human machine to constructive activity do not necessarily have to be an integral part of that machine. There is an entire discipline known as medical engineering dedicated to replacement of vital organs with operational hardware substitutes. After the weakened or impaired parts of the body have been strengthened as best they can, the rehabilitation engineer is then asked to fulfill the final complicated task of aiding in the return of the impaired person to a productive and normal way of life.

Modern science contends that almost anything can be done provided the resources are available. This applies most dramatically to the rehabilitation field since, through the use of electronic controls and mechanical servos, almost any function of the human machine can be duplicated. However, the price which must be paid for these functions is not only monetary but physical, since mechanical aids are usually bulky and add weight of their own. To extend this idea further, we can imagine a healthy man in a massive, powerful automation aid such as is now envisioned to give men the strength of machines. If the objective of this man is to write a letter or to operate a precision instrument, why then enhance his strength tenfold? And by the same argument, why must an impaired person be enshrouded by servomechanisms to increase his strength and capabilities to equal those of a healthy person when he can dictate his letter or he can have the precision instrument adapted to his limited capabilities? The proper aim of a research team should be to assist the patient to become a productive member of society by discovering a type of occupation within his capabilities, provided appropriate changes are made in his environment and equipment.

## ADJUSTMENT TO ENVIRONMENT

At first, changing a person's environment to suit his capabilities may seem the most lengthy and involved approach to the problem since one's surroundings may seem to extend forever. However, when it is realized that the boundaries of one's immediate environment are quite narrow, the scope of the task is smaller. For this reason, when a rehabilitation engineer first meets his prospective 'patient,' he must examine not only the person's needs and wants, but also the necessity of fulfilling these wishes. Obviously, a partially paralyzed person will want an elevator to his driveway and a specially designed car so that he can get out and be a part of the outside world. Most often, however, a ramp to the sidewalk and an electric wheelchair will broaden the patient's environment far beyond his needs. Another example is the wheelchair-bound female patient who insists that all her kitchen

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appliances and surfaces must be lowered so that she may reach them, whereas a raised false floor will equally expand her capabilities for a fraction of the expense.

### PATIENT EMPLOYMENT

Modern society's foremost measure of the return of a handicapped person to a normal existence is his capability to perform a task. The goal of most rehabilitation agencies is to find employment for their patients as soon as possible. One of the goals of the rehabilitation engineer, then, must be to create a comfortable and efficient working environment for the disabled.

First, a suitable occupation for the patient must be determined through psychological testing to determine interests and aptitude, investigation of the client's work record and experience, and determination of the limitations of the job. Once the vocation has been chosen, the rehabilitation engineer must examine the requirements of the task. Then he and the proper physicians and psychologists study the physical, psychological, and mental capabilities of the patient to determine whether further investigation is warranted. If everything is suitable for continued investigation into the employment possibility, the engineer must prepare a detailed feasibility study proving that even with the special adaptations and training necessary for the patient to perform his task, he will pursue gainful employment. If the engineer, with the assistance of psychological and medical advisers, cannot prove the economical feasibility of the method of employment before its inception, then the method must be dropped with the hope that in the future a more advanced technology will make the idea realizable. It is in this capacity that the engineer is most valuable, since his feasibility study can prevent needless expenditures on a hopeless scheme, leaving the resources of his research team available for the exploration of new possibilities.

### HOME WORKSHOP

Once the proper vocation has been chosen for the disabled person, the engineer must apply those concepts already outlined in his study to provide the person with a convenient and efficient working environment. In the case of the severely handicapped, the patient's home is his best workshop. This is especially convenient since any alterations which contribute to the patient's personal comfort, such as adaptation of toilet facilities, not only increase the patient's on-the-job time and comfort, but also add to the comfort of his home.

The problem of transportation is also aided since working materials can usually be transported to the home more conveniently and less often than transportation of the individual to an office. Finally, the economics of a home workshop is most desirable, since the overhead expense of a place of employment is eliminated.

Assuming that the workshop is to be in the home, the patient and the engineer must choose a suitable place for work. The first criterion is that the work area be removed from the living area. If this is not possible, then a part of a

*Continued on page 8*

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## REHABILITATION ENGINEERING—CONTINUED FROM PAGE 5

room must be designated as the work area with the understanding that it is to be used for nothing else. Since such a work area is, of necessity, small to cause as little inconvenience as possible, the next task is to seek out the proper furniture and instruments needed, keeping their size as small as possible. It must be kept in mind that these appliances will remain in the patient's home for a long period of time, so appearance of the equipment is of utmost importance. It is not necessary to isolate such a work area by a curtain or screen if its appearance does not upset the household.

## EQUIPMENT ADAPTATION

Furniture is usually the easiest commodity to adapt to such a workshop. The need for expensive adjustable tables and chairs can be eliminated by permanently adjusting an ordinary piece of furniture to a proper working height. Storage chests and files in all heights and configurations can be obtained as stock items and should be utilized to protect working tools and materials from household hazards. Adequate lighting is of utmost importance and should be provided regardless of expense. Ordinary household fixtures usually give insufficient light for close work. A final necessary item of furniture for the work area is a clock. This will help the patient regulate his work hours and habits.

The equipment used by the patient in his job is usually difficult to adapt to his needs, since machines and utensils are often rented or borrowed, and radical changes in their operation might be objectionable to their owner. However, if these adaptations can be made to improve the efficiency of operation of the device, or if the device can easily be returned to its original state, then the alterations should not be objectionable. The hesitancy to alter the physical state of a device should not affect the operation of the adaptation. An easy temporary adaptation is the addition of tape and tongue depressors to act as levers and extensions. This is a poor substitute for rigid aids since the tape becomes loose and sloppy. Simple, easy-to-install and -remove adaptations are most desirable, preferably made from available stock items. A prime example of this is the knob. Most knobs are of a minimal size so that considerable compression must be applied to turn them. Often space limitations make these small knobs necessary. However, when the space is available these knobs should be replaced. Even when the patient has good use of his hands, they are usually weak from disuse and every consideration should be taken to make their use comfortable. There are many ways to cure the small knob, but the easiest is by replacing it with a large, easy-to-grip knob or with a lever. Large knobs are available in all sizes and levers are simple to fabricate.

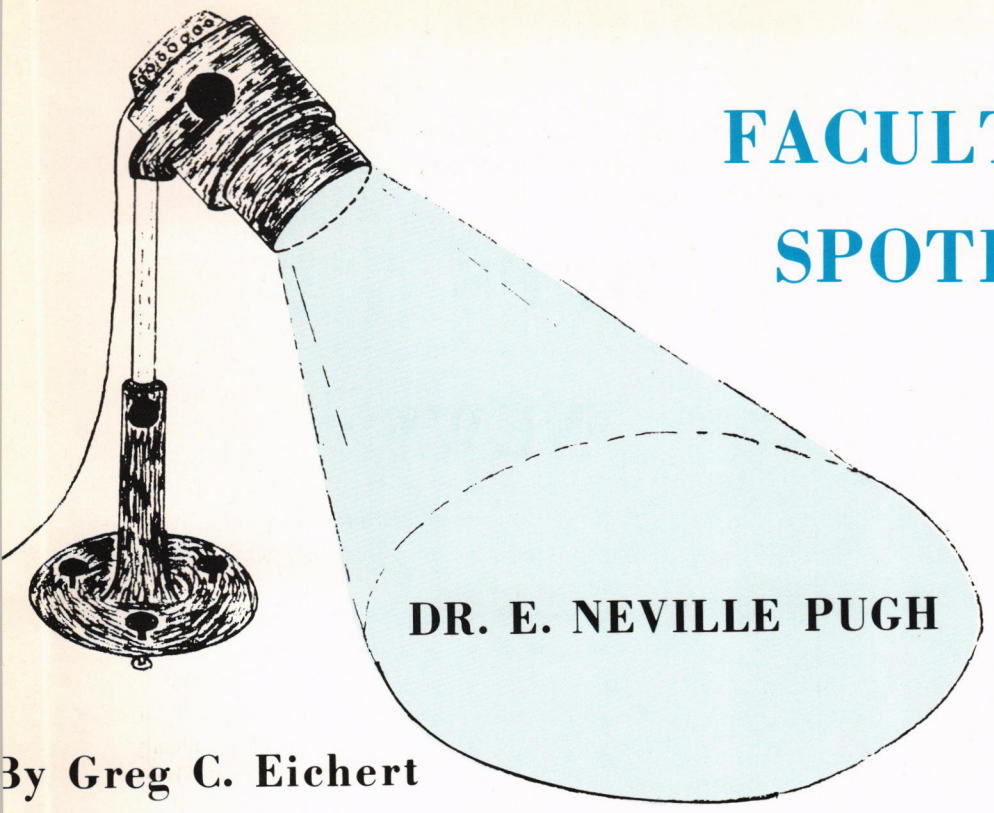
Further requirements of equipment are that all controls should be centrally front-mounted and all movements be smooth and simple. Also, if there is a choice of equipment, the machine which requires the least adaptation and presents the best appearance should be chosen.

## PRODUCTION ANALYSIS

Once all the adaptations have been made and the patient has started work, the engineer has the further responsibility of studying every aspect of the patient's day-to-day production. He must prepare statistical and quantitative proof that the application is as efficient and productive as possible. Then he must prepare a second feasibility study based on actual operation. If the operation does not economically warrant its continuation, it is the obligation of the engineer and those who worked with him to discontinue the operation and discover where the miscalculation was made so that this new knowledge will help in future feasibility studies. If the operation is economically feasible in practice, the goal of the research team has been reached. The research team must then record all of its methods, findings, and conclusions so that it may help other agencies to achieve the same results.

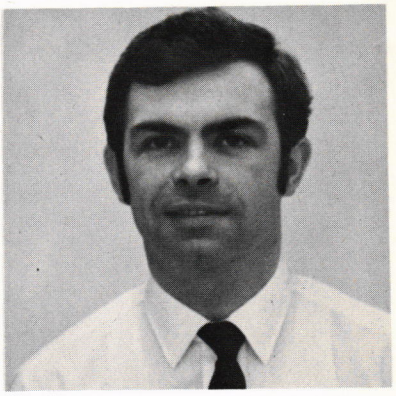
EDITOR'S NOTE:

Jim Bladen has worked for the George Washington University Research Rehabilitation and Training Center on a part-time basis as a programmer and research assistant. Jim was a past Editor of MECHELECIV Magazine and graduates this June with a Bachelor's degree in Electrical Engineering.



# FACULTY SPOTLIGHT

## DR. E. NEVILLE PUGH



By Greg C. Eichert

Dr. E. Neville Pugh of the Engineering Mechanics department is teaching CE 140 and EM 232, the undergraduate and graduate Material Science courses this year at S.E.A.S.

Dr. Pugh devotes most of his time here at S.E.A.S. in Material Science research centered around the topics of fracture of brittle solids, and stress-corrosion cracking.

His PhD dissertation was on the subject of the stress-corrosion of Aluminum alloys, completed at the University of Wales, United Kingdom in 1959. He also did his undergraduate work at the University of Wales in Metallurgy. All in all, Dr. Pugh has written some 35 papers in the areas of brittle fracture and stress-corrosion cracking.

Dr. Pugh worked for the Australian government for some time at their Defense Standards Labs in Sydney, where he devoted 90% of his time to research and 10% of his time to fracture investigation. At present, Dr. Pugh works two days a week for RIAS, Research Institute for Advanced Studies, part of the Martin-Marrietta Corporation, where he is the head of Physical Metallurgy until the end of May when he will devote his full time to S.E.A.S.

Dr. Pugh would like to see the development of a stronger Material Science curriculum within his department. One of his ideas in this vane is to have the undergraduate material science course more relevant to the different majors of students taking the course. One way of doing this, Dr. Pugh says, is to extend CE 140 to a four credit course, so that a lab could be taught with it.

Dr. Pugh is a member of the Maryland Institute of Metals in which he was past president, AIME, American Institute of Metallurgical Engineers in which he is secretary of the Corrosion-resistant metals committee, and ASM, The American Society of Metals.

Dr. Pugh's outside interests include golf, bridge, and the tutoring of rural, underprivileged grade school students in Crofton, Maryland, where he lives.

We of MECHELECIV welcome Dr. Pugh to S.E.A.S. on behalf of the students and faculty.

# CAMPUS NEWS

## THETA TAU FRATERNITY

Theta Tau will be closing the year with two of its most popular events. The Banquet and Ball will be held on May 2nd at the Sheraton Park Hotel and an auto rally will be held on April 26th open to all the young at heart.

Recently the election of new officers took place with the newly elected officers as follows:

Bob Grant – Regent
Greg Eichert – Vice-Regent
Steve Momii – Treasurer
Al Lee – Scribe
Bill Zeeman – Corresponding Secretary

These new officers hope to continue building in the spirit of the last administration.

On the morning of May 2nd, seven more brothers will be initiated into the Fraternity:

Paul Blue
Bob Keltie
Elliot Lieberman
Bob Lucas
Greg Smith
Dick Tabor

This will bring the total number of active brothers to thirty-one. Three brothers will also be graduating this semester:

Marshall Azrael
Al DeLuca
Rich Noble

We wish the best to these brothers and we hope they will come to visit us often.

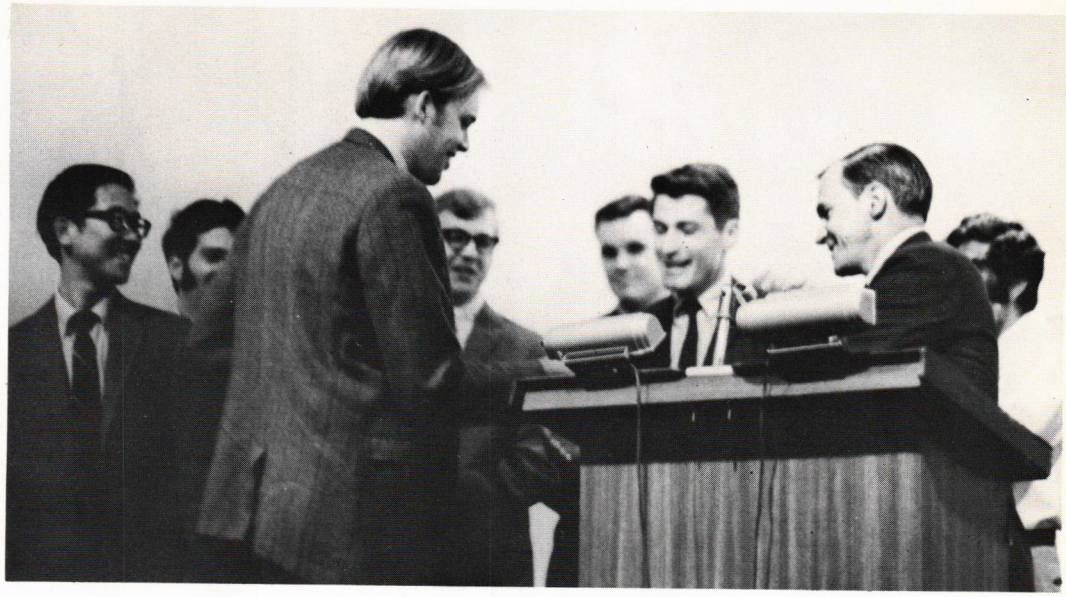
## I.E.E.E.

The student branch of I.E.E.E. finished up this year's activities by sponsoring a luncheon on May 1st and an officer election meeting in early May.

In the month of March, a meeting was held at which technical films were shown at the conclusion of which plans were made for a tour of Goddard Space Flight Center. The tour, held on April 7th, was attended by about 25 engineers. The group was shown a computerized on-board satellite data system, an ion engine test facility, and an MOS-FET production facility. This specially arranged tour proved to be a valuable experience for all participants.

## 1970 AWARDS PRESENTATION

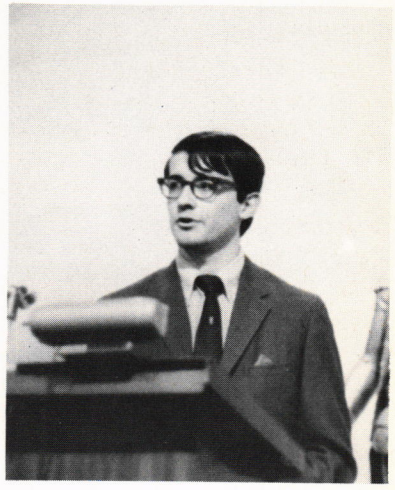
**Former President of the Engineers' Council, Bob Grant (left), presents the Engineers' Week Chairman's Plaque to a grinning Marshall Azrael.**



**John Davies, the long road finally at an end, accepts the senior tie clasp from Dr. Doug Jones.**

On Thursday afternoon, April 30th, the annual awards presentation took place in Lower Lisner. Among the awards handed out were Engineers' Council Keys, MECHELECIV Keys, a plaque for the Engineers' Week Chairman, The Engineers' Council gavel to the new President, and the traditional tie-clasps for members of the graduating senior class. This years' seniors received the remaining quantity of inch-wide official G.W. tie clasps. Grateful as they were in receiving them, most graduates will never get the chance to wear them until the constantly changing fashion scene brings narrow ties back into popularity. A further attraction was the award that MECHELECIV won at this years' E.C.M.A. Convention in Miami Beach: a third place for the best single editorial.

**Don Wallroth (left), the newly elected president of the Engineers' Council, accepts the gavel from Bob Grant.**

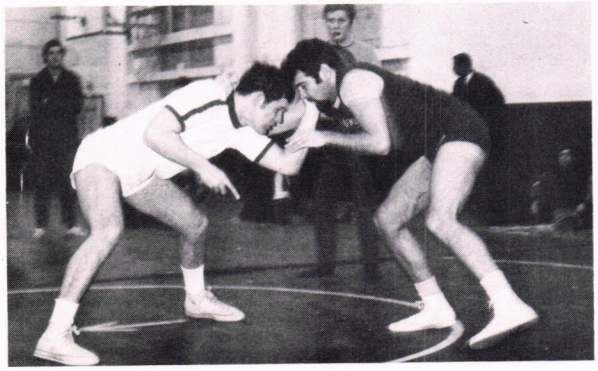


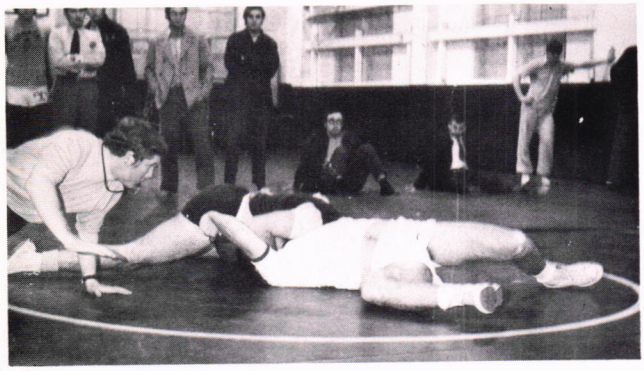
**Former Editor-In-Chief of *Mechelecіv* Magazine, David Armstrong, hands out the few, but well-deserved *Mechelecіv* Keys.**

**Dean Harold Liebowitz (extreme left) mingles with faculty and students.**

As far back as memory serves, the solid refreshments have never been quite as elaborate as those this time: caviar, vienna sausage, and liver & bacon goodies beckoned to the brave; all courtesy of Slater's renowned gastronomists. The Engineers' Council played host with a wide variety of drinkables served up with the predictable Engineers' disdain for the 'watered-down-drink'.

## SPORTS





Dave Sobel (above, right) pins his man within two minutes (below).

Unlike the rest of the University, the engineers do not take gym. That doesn't necessarily mean, however, that we aren't great athletes. In fact, Theta Tau enters teams in at least ten different sports, and, in this past year, placed sixth out of thirty teams entered in the intramural sports program. In order for the engineers to have a winning team in intramurals, it takes time for them to practice as a unit. Since most engineers spend the majority of their time studying, they do not fare well together. Individually, though, they excel, showing their true individual ability. For this reason, the GWU Engineers won first place in wrestling.

Left to right: front row; Bob Grant, Frank Atwood, Victor Kit, back row; Lou Darden, Dave Sobel, & Art Mitchell (Not Shown: Steve Momii).

# Don't get hung up on this hang-up.

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And NASA has chosen General Electric to find ways of cutting engine noise even further.

It may take an engineer years of work before he can work out the solution to a problem like noise in jet engines. And it may be years before his solution has any impact on the environment.

But if you're the kind of engineer who's anxious to get started on problems like these and willing to give them the time they take, General Electric needs you.

Think about it in a quiet moment.
Or, better yet, a noisy one.

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